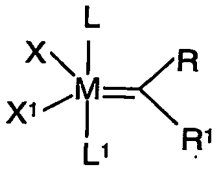
CLAIMS

1. A metathesis reaction between at least two olefinic compounds which are the same or different, each olefinic compound comprising a non-cyclic olefin or a compound which includes a non-cyclic olefinic moiety; the metathesis reaction being carried out in the presence of a catalyst of formula (I):



..... (I)

wherein:

M is ruthenium or osmium;

X and X^1 are independently selected from an anionic ligand;

R and R^1 are independently selected from H or an organyl group; and

L and L^1 are independently selected from any neutral electron donor ligand;

and the metathesis reaction being characterised therein that it is carried out in the presence of a phenolic compound in the form of a phenol or a substituted phenol, which substituted phenol includes at least one hydroxyl and at least one further moiety other than H and OH attached to an arene ring.

2. The metathesis reaction as claimed in Claim 1, wherein a product is produced which does not include a cyclic moiety formed by the metathesis reaction.

3. The metathesis reaction as claimed in either one of claims 1 or 2, wherein the metathesis reaction is between two non-cyclic olefins which are the same or different.

4. The metathesis reaction as claimed in claim 3 wherein each of the non-cyclic olefins comprises an olefin with a single double bond.

5. The metathesis reaction as claimed in claim 4, wherein the metathesis reaction is between ethylene and an internal non-cyclic olefin.

6. The metathesis reaction as claimed in claim 4, wherein the metathesis reaction is between two non-cyclic olefins which are the same.

7. The metathesis reaction as claimed in claim 6, wherein the non-cyclic olefins are both a non-branched 1- alkene.

8. The metathesis reaction as claimed in claim 3, wherein the metathesis reaction is between at least two non-cyclic olefins of which at least one is contained in a feedstock derived from a Fischer-Tropsch reaction.

9. The metathesis reaction as claimed in claim 8, wherein the feedstock contains at least one impurity selected from the group consisting of a carbonyl containing compound, an alcohol, an aromatic compound, a diene, a triene, an alkyne and an aldehyde.

10. The metathesis reaction as claimed in any of the preceding claims, wherein M in formula (I) is ruthenium.

11. The metathesis reaction as claimed in any of the preceding claims, wherein X and X^1 are independently selected from the group consisting of hydrogen; halide; and a compound selected from the group consisting of $C_1 - C_{20}$ alkyl; aryl; $C_1 - C_{20}$ alkoxide; aryloxide; $C_3 - C_{20}$ alkyldiketonate; aryldiketonate; $C_1 - C_{20}$ carboxylate; arylsulfonate; $C_1 - C_{20}$ alkylsulfonate; $C_1 - C_{20}$ alkylthiol; aryl thiol; $C_1 - C_{20}$ alkylsulfonyl; and $C_1 - C_{20}$ alkylsulfinyl, the compound being optionally substituted with one or more other moieties selected from the group consisting of $C_1 - C_{10}$ alkyl; $C_1 - C_{10}$ alkoxy; aryl and halide.

12. The metathesis reaction as claimed in any of the preceding claims, wherein X and X^1 are each chloride.

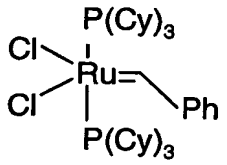
13. The metathesis reaction as claimed in any of the preceding claims, wherein R and R^1 are each independently selected from the group consisting of hydrogen and an organyl selected from the group consisting of C_1-C_{20} alkyl; C_2-C_{20} alkenyl; C_2–C_{20} alkynyl; aryl; C_1–C_{20} carboxylate; C_1-C_{20} alkoxy; C_2-C_{20} alkenyloxy; C_2–C_{20} alkynyloxy; aryloxy; C_2-C_{20} alkoxycarbonyl; C_1-C_{20} alkylthiol; aryl thiol; C_1–C_{20} alkylsulfonyl and C_1-C_{20} alkylsulfinyl, the organyl being optionally substituted with one or more moieties selected from the group consisting of C_1–C_{10} alkyl; C_1–C_{10} alkoxy; aryl; and a functional group selected from the group consisting of hydroxyl; thiol; thioether; ketone; aldehyde; ester; ether; amine; imine; amide; nitro; carboxylic acid; disulfide; carbonate; isocyanate; carbodiimide; carboalkoxy; carbamate; and halogen.

14. The metathesis reaction as claimed in claim 13, wherein R is H and R^1 is phenyl or $-C{=}C(CH_3)_2$.

15. The metathesis reaction as claimed in any of the preceding claims, wherein L and L^1 are each independently selected from the group consisting of phosphine, sulfonated phosphine, phosphite, phosphinite, phosphonite, arsine, stibine, amine, amide, imine, nitrosyl and pyridine.

16. The metathesis reaction as claimed in any of the preceding claims, wherein each of L and L^1 comprises a compound containing phosphorus.

17. The metathesis reaction as claimed in claim 16, wherein the catalyst of formula I is a compound of formula (II):



..... (II)

wherein Cy is cyclohexyl.

18. The metathesis reaction as claimed in any of the preceding claims, wherein the phenolic compound comprises a phenol.

19. The metathesis reaction as claimed in claim 18, wherein the phenolic compound comprises phenol.

20. The metathesis reaction as claimed in any of claims 1 to 17, wherein the phenolic compound comprises a substituted phenol which substituted phenol includes at least one hydroxyl and at least one further moiety other than H and OH attached to an arene ring.

21. The metathesis reaction as claimed in any of claims 1 to 17, wherein the phenolic compound comprises an optionally substituted polyaromatic phenol.

22. The metathesis reaction as claimed in any of the preceding claims, wherein the molar ratio of phenolic compound to catalyst is from 1 to 5000 molar equivalents of phenolic compound to ruthenium or osmium.

23. The use of a phenolic compound in the form of phenol or a substituted phenol which substituted phenol includes at least one hydroxyl and a further moiety other than H and OH attached to an arene ring, in a metathesis reaction between at least two olefinic compounds which are the same or different, each olefinic compound comprising a non-cyclic olefin or a compound which includes a non-cyclic olefinic moiety, and the metathesis reaction being carried out in the presence of a catalyst of formula (I) as defined in claim 1.

24. The use of a phenolic compound as claimed in claim 23, to enhance a metathesis reaction, the enhancement being selected from:

i) an increase in lifetime of the catalyst;

ii) an increase in the resistance of the catalyst to olefin feed impurities;

iii) an increase in the selectivity of the metathesis reaction in respect of at least one of the following aspects:

a. reducing the isomerisation of a starting olefinic compound;

b. reducing the formation of secondary metathesis products; and

iv) an increase in the yield of the metathesis product(s);

v) an increase in the rate of reaction; and

vi) the use of lower catalyst concentrations.

25. A product produced by the reaction of any one of claims 1 to 22.